



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/064,510	07/23/2002	Thomas Martin Angeliu	RD-28181	6622
6147	7590	06/24/2004	EXAMINER	
GENERAL ELECTRIC COMPANY GLOBAL RESEARCH PATENT DOCKET RM. BLDG. K1-4A59 SCHENECTADY, NY 12301-0008			WYSZOMIERSKI, GEORGE P	
			ART UNIT	PAPER NUMBER
			1742	

DATE MAILED: 06/24/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

10/064,510

Applicant(s)

ANGELIU, THOMAS MARTIN

Examiner

George P Wyszomierski

Art Unit

1742

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-63 is/are pending in the application.
- 4a) Of the above claim(s) 29-63 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-22 and 24-28 is/are rejected.
- 7) ☒ Claim(s) 23 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date 20020730, 20020827.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_.

1. Restriction to one of the following inventions is required under 35 U.S.C. 121:
  - I. Claims 1-28, drawn to a method, classified in class 75, subclass 334.
  - II. Claims 29-63, drawn to an article, classified in class 148, subclass 400+.

2. The inventions are distinct, each from the other because:

Inventions I and II are related as process of making and product made. The inventions are distinct if either or both of the following can be shown: (1) that the process as claimed can be used to make other and materially different product or (2) that the product as claimed can be made by another and materially different process (MPEP § 806.05(f)). In the instant case the product as claimed can be made by a materially different process, such as a vapor deposition process.

Because these inventions are distinct for the reasons given above and have acquired a separate status in the art because of their different classification and recognized divergent subject matter, restriction for examination purposes as indicated is proper.

3. During a telephone conversation with Paul DiConza, attorney of record on June 14, 2004 a provisional election was made with oral traverse to prosecute the invention of Group I, claims 1-28. Affirmation of this election must be made by applicant in replying to this Office action. Claims 29-63 are withdrawn from further consideration by the examiner, 37 CFR 1.142(b), as being drawn to a non-elected invention.

4. Claim 1 is objected to because the phrase "using at least one...group consisting of" in lines 6-7 of this claim does not make sense in context, i.e. no Markush group is recited. The examiner suggests replacing this phrase with the word --by--.

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claims 1-11, 13-16, 18, 19, 24 and 25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lin (U.S. Patent 5,401,338) in view of McCullough et al. (U.S. Patent 6,245,425).

Lin discloses making a metal matrix composite (e.g. alumina in an aluminum alloy matrix) by dispersing alumina particles of 0.05 micron (50 nm) size in the molten alloy by oscillating by ultrasonic waves for 30 minutes. See example 1 of Lin. This example produces a material containing 8% alumina, which meets the limitations of instant claim 24. While this is greater than the maximum amount permitted by instant claim 25, clearly one of skill in the art, by performing the same process steps as in the Lin example, would easily be able to make materials meeting the limitations of claim 25 simply by using less reinforcement. With regard to instant claims 4-10, 13 and 14, note Lin column 7, lines 8-19.

Lin does not specify the use of a wetting agent as required by the instant claims. The McCullough patent indicates that it is known in the art that a significant obstacle to successfully making metal matrix composites is the difficulty in wetting the reinforcement with the matrix

material; see McCullogh column 7, lines 20-23. The solution devised by McCullogh is the use of an ultrasonic horn made of, e.g. a refractory metal; see McCullogh column 7, lines 31-48. This results in wetting of the reinforcement to the molten metal; see McCullogh column 8, line 37-41.

Based on the disclosure of McCullogh, it would have been considered an obvious expedient to one of ordinary skill in the art to employ a wetting agent as presently claimed when performing the process as disclosed by Lin.

7. Claims 1-22 and 24-28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Angeliu et al. (U.S. Patent 6,251,159) in view of either Lin or McCullogh et al.

Angeliu discloses forming metal matrix composites by dispersing nanophase particles in a metallic melt. The particles are dispersed to a level as recited in instant claims 20-22 and 26-28; see Angeliu column 5, lines 1-2. The particles and the metal used by Angeliu may be as set forth in the instant claims; see Angeliu column 3, lines 19-36. The embodiment disclosed in column 4, lines 23-38 of Angeliu involves the use of coated nanospheres, which would meet the "wetting" or "coating" limitations recited in the instant claims.

Angeliu does not disclose using ultrasonic energy to disperse the particles in the melt. McCullogh and Lin both indicate that it was known in the art, at the time of the invention, to improve the dispersing of reinforcement particles in a metal matrix by the use of ultrasonic vibration, as set forth supra.

Thus, the disclosures of Lin or McCullogh et al., together with that of Angeliu, would have taught the claimed invention to a person of ordinary skill in the art.

Art Unit: 1742


8. Claim 23 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. The prior art does not disclose or suggest directionally solidifying and forming a single crystal in conjunction with the method as defined in claim 1.

9. The remainder of the art cited on the enclosed PTO-892 and 1449 forms is of interest. This art is held to be no more relevant to the claimed invention than the art as applied in the rejections, *supra*.

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to George Wyszomierski whose telephone number is (571) 272-1252. The examiner can normally be reached on Monday thru Friday from 8:00 a.m. to 4:30 p.m. Eastern time.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Roy King, can be reached on (571) 272-1244. Effective October 1, 2003, all patent application related correspondence transmitted by facsimile must be directed to the central facsimile number, (703) 872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

  
GEORGE WYSZOMIERSKI  
PRIMARY EXAMINER

GPW  
June 17, 2004